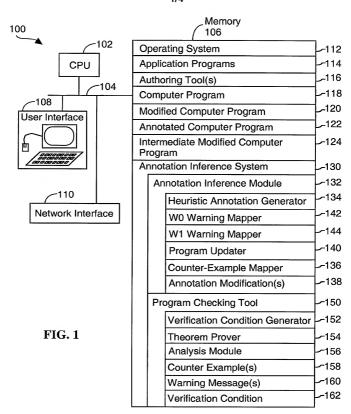Filed: December 4, 2001
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100

102

CPU

104

108

User Interface

110

Network Interface

Memory **106**	
Operating System	112
Application Programs	114
Authoring Tool(s)	116
Computer Program	118
Modified Computer Program	120
Annotated Computer Program	122
Intermediate Modified Computer Program	124
Annotation Inference System	130
Annotation Inference Module	132
Heuristic Annotation Generator	134
W0 Warning Mapper	142
W1 Warning Mapper	144
Program Updater	140
Counter-Example Mapper	136
Annotation Modification(s)	138
Program Checking Tool	150
Verification Condition Generator	152
Theorem Prover	154
Analysis Module	156
Counter Example(s)	158
Warning Message(s)	160
Verification Condition	162

FIG. 1

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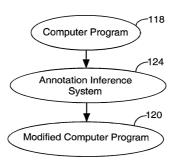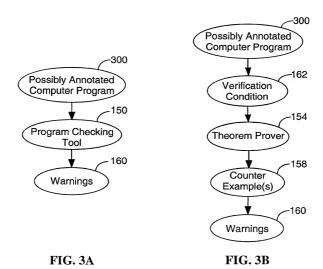Gary S. Williams, PENNIE & EDMONDS LLP
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```
        ┌─────────────────────┐  ┌─118
        │  Computer Program   │
        └─────────────────────┘
                  │
                  ▼
    ┌─────────────────────────┐  ┌─124
    │  Annotation Inference   │
    │        System           │
    └─────────────────────────┘
                  │
                  ▼
  ┌───────────────────────────────┐  ┌─120
  │  Modified Computer Program    │
  └───────────────────────────────┘
```

FIG. 2

```
  ┌──────────────────────┐  ┌─300
  │  Possibly Annotated  │
  │  Computer Program    │
  └──────────────────────┘
            │
            ▼
  ┌──────────────────┐  ┌─150
  │ Program Checking │
  │      Tool        │
  └──────────────────┘
            │
            ▼
      ┌──────────┐  ┌─160
      │ Warnings │
      └──────────┘
```

FIG. 3A

```
  ┌──────────────────────┐  ┌─300
  │  Possibly Annotated  │
  │  Computer Program    │
  └──────────────────────┘
            │
            ▼
      ┌──────────────┐  ┌─162
      │ Verification │
      │  Condition   │
      └──────────────┘
            │
            ▼
    ┌────────────────┐  ┌─154
    │ Theorem Prover │
    └────────────────┘
            │
            ▼
      ┌──────────┐  ┌─158
      │ Counter  │
      │Example(s)│
      └──────────┘
            │
            ▼
      ┌──────────┐  ┌─160
      │ Warnings │
      └──────────┘
```
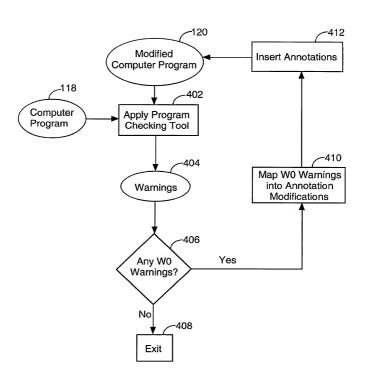
FIG. 3B

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FIG. 4

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502
Heuristically Construct
Candidate set of
Annotations

118
Computer Program

504
Insert
Candidate set
of Annotations
Into Program

122
Annoted
Computer Program

124
Intermediate Modified
Computer Program

506
Apply Program
Checking Tool

514
Remove From Program
Any Mentioned
Candidate Annotation

160
Warnings

512
Map W1 Warning into an
Annotation Modification

510
Any
W1 warning
that mentions a
Candidate
Annotation?

Yes

No
516
Exit

FIG. 5